

Scientific Engineering Center "Nuclear Physics Researches" ("YaFI")



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Stationary Radiation Portal Monitors

Rubeg

Detection Limit

250 g ^{235}U metal

$8 \cdot 10^4$ n/sec ^{252}Cf

Dozor

Detection Limit

3 g ^{235}U metal

$3 \cdot 10^3$ n/sec ^{252}Cf

International standards:

IEC 62244 – “Installed Radiation Monitors for the Detection of Radioactive and Special Nuclear Materials at National Borders”

IAEA NSS - “Technical and Functional Specifications for Border” (Recommendations)

National (USA):

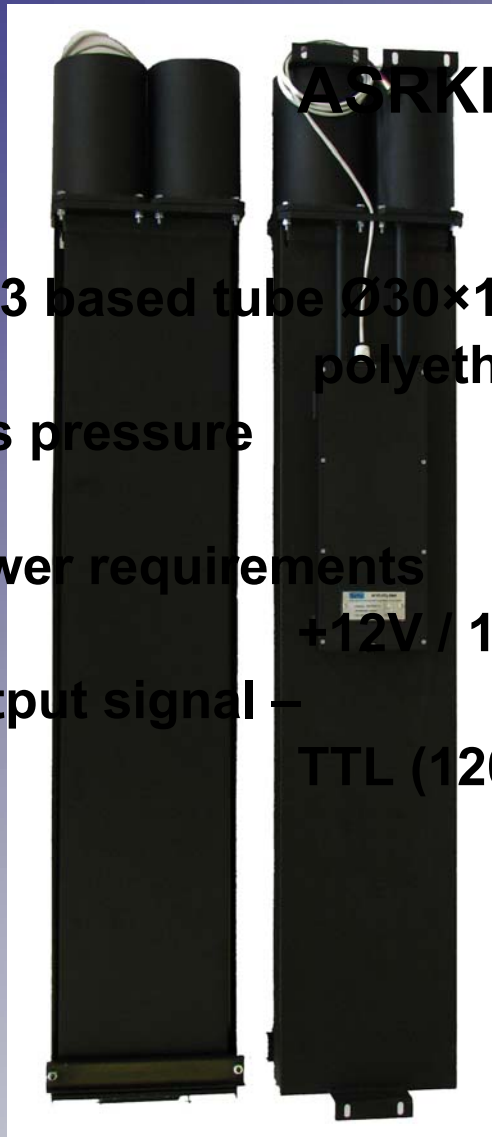
ANSI N42.35-2006 - “American National Standard for Evaluation and Performance of Radiation Detection Portal Monitors”

National (Russia):

GOST R 51635-2000 - “Nuclear Material Radiation Monitors. General Specifications”

GOST R 52118-2003 - “Standard Sources of Nuclear Materials for Radiation Monitors”

Gamma and Neutron detectors



ASRKB1U.08

He-3 based tube $\varnothing 30 \times 1000$ mm

Gas pressure

Power requirements

Output signal –

polyethylene moderator

4.0 atmospheres

+12V / 100 mA

TTL (120R)

Polystyrene detector

polyethylene moderator

Two PMT in detector in coincidence mode

(to decrease the noise level);

Energy sensitivity range

Power requirements

Output signal –

TTL (120R)

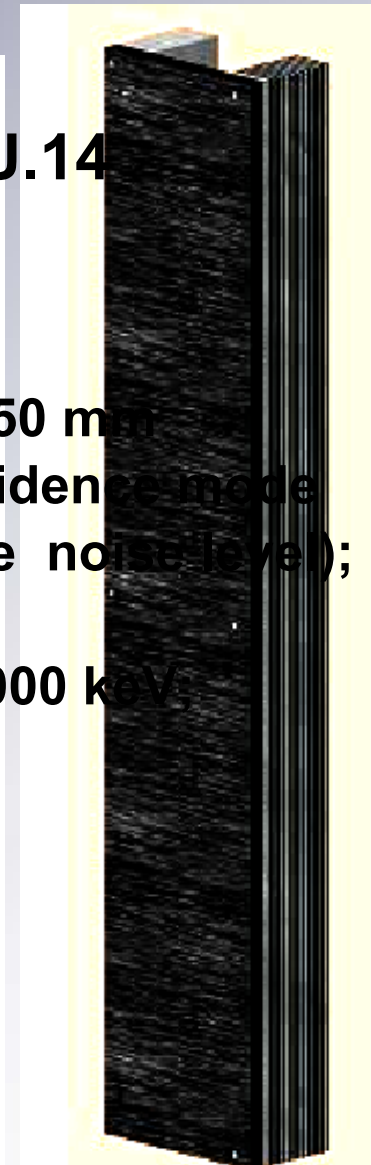
ASRKB1U.14



1050x200x50 mm

30 keV – 3000 keV;

+12V / 100 mA





Systems



Neutron Search Detector



15 tubes in
polyethylen moderator

Static sensitivity 20cm^2

False Alarm Rate 1 per 600 sec

Battery life >12
hours

Multifunctional IR-560

NaI (TI)

**He3 tubes
in
polyethylene**



Isotope identification

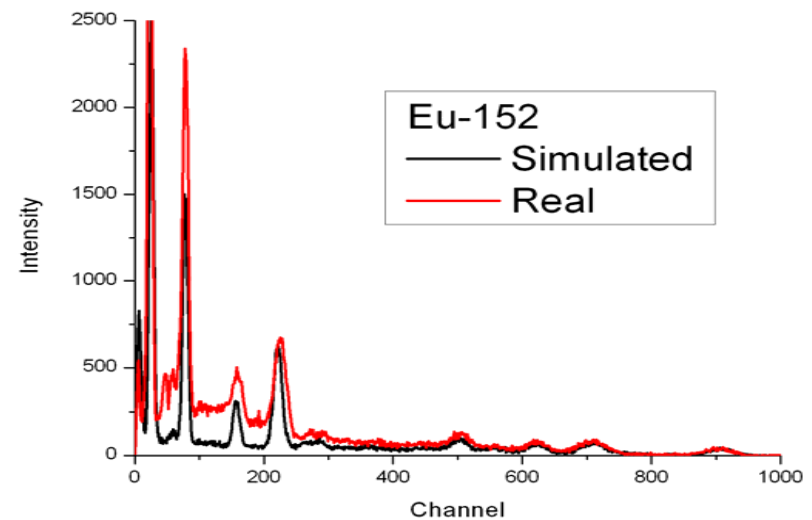
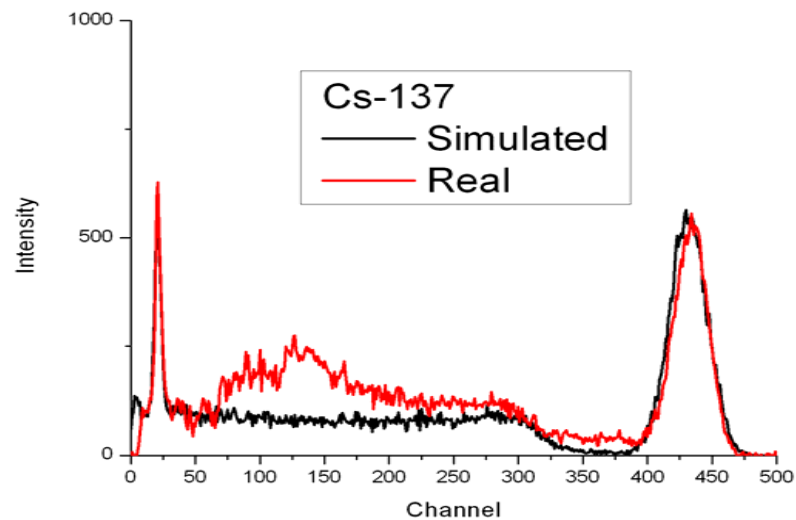
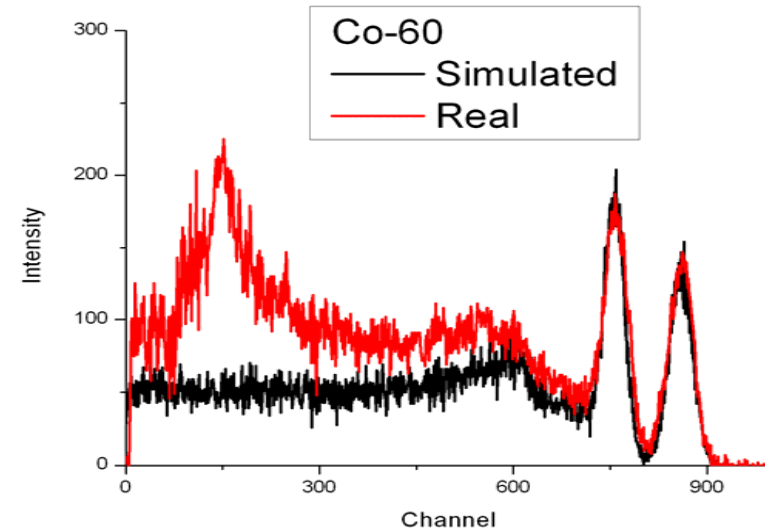
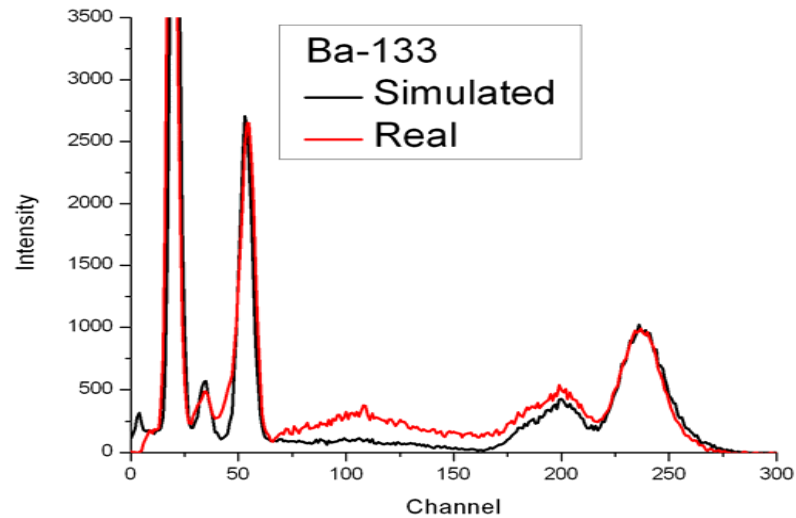
Nuclear materials
 ^{235}U , ^{237}Np , ^{239}Pu

Industrial isotopes
 **^{57}Co , ^{60}Co , ^{137}Cs ,
 ^{133}Ba , ^{241}Am etc.**

Medical
 ^{123}I , ^{67}Ga , $^{90\text{m}}\text{Tc}$

Natural occurring
 ^{40}K , ^{226}Ra , ^{238}U

Nuclide Identification



Training Radiation Portal Monitor

- ✓ Detection channels gamma, neutrons
- ✓ Setup conditions on a table
- ✓ Weight of pillar 18 kg
- ✓ Occupancy sensor Infra-red
- ✓ Alarm indication audio, light signal
- ✓ Video system TCP/IP
- ✓ UPS >1 hour lifetime
- ✓ Tamper switch magnetic
- ✓ “Control room” equipment notebook PC
- ✓ Power 90-260V / 50..60Hz



Thank you for attention

Saint-Petersburg, Russia
www.yafi.ru